

the war have been unfavorable to the peaceful pursuit of fern lore, we have maintained our number somewhere near the 275 mark.

With twenty-five years of our development passed into history, we have a body of memory and tradition worth cherishing. And if the recently suggested plan of reprinting the early numbers of the Fern Bulletin should prove feasible it would be of a fitting celebration of the opening of our second quarter century.

AUBURNDALE, MASS.

Ferns of the District of Columbia¹

WILLIAM R. MAXON

The flora of the District of Columbia, first brought to familiar notice by Ward's classic "Guide to the Flora of Washington and Vicinity,"² has to an unusual degree the interest always attaching to the plants of a limited region in which more or less definite life zones meet. This interest is reflected in the ferns and their allies.

The area adopted by Ward and by later botanists for the "District flora" is a circle of 15 miles radius, with the Capitol as its center. This includes the city of Washington, which is coextensive with the present District of Columbia, and very much more territory in adjacent parts of Maryland and Virginia. Roughly bisecting this territory obliquely, northeast and southwest, is the so-called "fall line" or common boundary separating the Coastal Plain and the lower foothills of the Piedmont Plateau, two regions which both geologically and physiographically are widely different throughout their whole extent along the Atlantic Coast,

¹ Published with the permission of the Secretary of the Smithsonian Institution.

² Bulletin 22 of the U. S. National Museum. 1881.

and are well known to support characteristic floras. The interlocking of these zones along the fall line in the vicinity of Washington and the various factors controlling to a great extent the local distribution of plant and animal life are interestingly discussed by W. L. McAtee in a recent volume entitled "A Sketch of the Natural History of the District of Columbia and Vicinity."³ Similar data are presented also in the forthcoming "Flora of the District of Columbia and Vicinity,"⁴ by A. S. Hitchcock and Paul C. Standley, with the assistance of the botanists of Washington. In both works the more important collecting localities and their characteristic vegetation are described, and to these the reader is referred for fuller information. The list of species given below is deemed of sufficient interest to fern students to justify its publication separately, and it may besides serve a useful purpose to members of the Fern Society visiting Washington.

The local Piedmont area lies chiefly northwestward and includes most of Rock Creek Park and the upper Potomac region, extending from the Aqueduct Bridge at Georgetown to Little Falls, High Island, Cabin John, and the Great Falls of the Potomac, the last mentioned locality lying at the edge of the 15-mile circle. The soils of this region are derived by the disintegration of metamorphic rocks and are mostly neutral or but weakly acid. It is mostly broken country, characterized by sharp declivities and by frequent streams running rapidly between steep banks, and, especially in the near vicinity of the river, is beautiful and often picturesque. The abrupt wooded bluffs of the Virginia shore from Great Falls to a point opposite Cabin John are of especial interest as sheltering several of the rarer local ferns. *Camptosorus* occurs sparingly on

³ Bulletin No. 1, Biological Society of Washington. Pp. 142. 1918.

⁴ Contr. U. S. Nat. Herb., Vol. 21. (In press.)

rock outcrops and mossy gneiss boulders of the shaded upper talus slopes; *Filix bulbifera* is found in two or three cool, well shaded situations at the foot of the talus; *Asplenium pinnatifidum* grows in earth pockets of the cliff at a single locality; *Pteretis nodulosa* occupies here and there considerable stretches of the shaded narrow belt of flood plain; and just above the last, especially at the mouth of the wooded ravines or "runs," *Athyrium pycnocarpon* and *A. thelypteroides* are locally abundant. The more exposed rocks of the summit and upper slopes are often covered by *Polypodium vulgare*, and the moister, lower areas of the talus slopes everywhere support large plants of *Dryopteris marginalis*. In one or two of the moist runs occur colonies of *Dryopteris Goldiana*. *Selaginella rupestris* is found in several rocky, open situations near Great Falls, and with it *Cheilanthes lanosa*. A single colony of *Asplenium montanum* occurs here also.

These records indicate very definitely the element of northern or mountain-loving species within the flora, and leave few additional species reasonably to be looked for, excepting *Asplenium Bradleyi* and *Athyrium angustum*.

The Coastal Plain region, lying mainly east of Washington proper and southward along the broad lower Potomac past Alexandria to Mount Vernon and Marshall Hall, is low and more nearly level, with contours mostly gentle, marking broad open valleys. The soils are inclined to be strongly acid. Much of this territory, like that of the Piedmont, is under cultivation; but there are also wide stretches given over to poison sumac and impassable cat-brier thickets, drained by sluggish streams, which only the most enthusiastic collector will explore in Washington's tropical dog-days, when the "jiggers" are at their worst.

The most interesting single feature of the local Coastal Plain area is the occurrence of the so-called magnolia bogs, well described by McAtee. These are small, open, gently sloping patches of white gravel underlaid by an impervious stratum of clay, their surface constantly irrigated by a thin sheet of water flowing from springs at the upper swampy border. Here are found a considerable number of typical pine barren plants, and here or in the near vicinity such "coastal" species as *Lygodium palmatum*, *Dryopteris simulata*, *Anchistea virginica*, *Lycopodium adpressum*, and, at a single locality, *L. carolinianum*—plants practically restricted to acid-soil situations. Since many such bogs doubtless await discovery, it is not unlikely that *Lycopodium alopecuroides* will be added eventually to the District flora.

Aside from the species mentioned above as practically limited to the Piedmont or to the Coastal Plain, there are many which occur generally throughout the local area, apparently showing no decided soil preference if exposure and drainage conditions are suitable. These are discussed in the following notes, which list 56 species, distributed among 25 genera. The list is not an unusually long one, but nevertheless is equal to that of many larger areas.

The city of Washington has grown rapidly in recent years, trolley lines stretching out to numerous small suburbs and far beyond them. Many still unspoiled woodlands are thus to be found within the city limits, and the more distant collecting grounds also are reached very quickly and easily. Two of the lines extend to Great Falls on opposite sides of the river, and a third parallels the river to Cabin John. The Chesapeake and Ohio Canal skirts the river, also, on the Maryland side, all the way to Great Falls, affording the easiest possible access to that wild region. Because of its

attractiveness, the upper Potomac gorge and adjacent bluffs have not unnaturally been explored more completely than other local regions; but the entire territory of the "District flora" is of very great interest, whether to the resident or visiting botanist, and will richly repay field study for many a year to come.

OPHIOGLOSSACEAE

OPHIOGLOSSUM VULGATUM L. Low moist woods or partially shaded, grassy slopes; nowhere common, though found at numerous localities. Just outside our area, at Chesapeake Beach, it occurs in great abundance, however.

BOTRYCHIUM VIRGINIANUM (L.) SWARTZ. Abundant; best developed in rich hilly woods on the Virginia side of the upper Potomac. First of June.

BOTRYCHIUM OBLIQUUM MUHL. Low, brushy pastures and moist, thin woods; common.

BOTRYCHIUM DISSECTUM SPRENG. Moist woods and thickets; common, but decidedly less so than *B. obliquum*.

(*Botrychium neglectum* Wood has been reported, probably in error.)

OSMUNDACEAE

OSMUNDA REGALIS L. Swamp borders and boggy or wet sandy woods; not uncommon, but as a rule lacking the vigorous appearance and large size of more northern plants.

OSMUNDA CINNAMOMEA L. Wet woods, swamps, and low, partially cleared areas; abundant.

OSMUNDA CLAYTONIANA L. Swamp edges, moist wooded slopes, or sandy alluvial soil; not very common, but found throughout.

SCHIZAEACEAE

LYGODIUM PALMATUM (BERNH.) SWARTZ. Wet "cat-brier" thickets and borders of low woods; several re-

stricted localities in the Coastal Plain, and probably of commoner occurrence. Occasionally offered for sale in Washington markets, where it is known as "Alice's fern."

POLYPODIACEAE

POLYPODIUM POLYPODIOIDES (L.) WATT. Shaded, flat, mossy rocks; gorge of the Potomac below Great Falls, Maryland side, the only locality. This species is here near its northern limit.

POLYPODIUM VULGARE L. Rocky banks or partially shaded cliffs; common along the upper Potomac and found in a few other localities.

ADIANTUM PEDATUM L. Rich, well-drained, rocky deciduous woods and shaded hillsides; common.

CHEILANTHES LANOSA (MICHX.) WATT. Earthy crevices of cliffs or rocky bluffs of the upper Potomac; rare; only three stations known, two of these near Great Falls.

PELLAEA ATROPURPUREA (L.) LINK. Several scattered stations; abundant at only one (Georgetown), here growing profusely in the mortar of an old retaining wall.

PTERIDIUM LATIUSCULUM (DESV.) MAXON.⁵ Sunny, sandy slopes, low thin woods, or old fields, and acid soil situations generally; abundant. (*Pteridium aquilinum* of American authors, in part.)

⁵ *Pteridium latiusculum* (Desv.) Maxon.

Pteris latiuscula Desv. Mém. Soc. Linn. Paris 6: 303. 1827.

This appears to be the proper name for our common bracken of the eastern United States, which differs very definitely from the European *P. aquilinum* (L.) Kuhn in outline and cut of blade and in its nearly or quite nonciliate outer indusium, *P. aquilinum* having the outer indusium conspicuously and persistently long-ciliate. Desvaux's brief description is unsatisfactory. A photograph of the type specimen (in the Paris Herbarium), recently received through the courtesy of Prince Roland Bonaparte, however, shows two incomplete fronds, labeled "T. N. et St. Pierre," that is, Newfoundland and the nearby island, St. Pierre. Since Newfoundland material at hand agrees with the fronds shown in the photo-

ANCHISTEA VIRGINICA (L.) PRESL. Swamps; infrequent, the known localities all in the Coastal Plain.

LORINSERIA AREOLATA (L.) PRESL. Swamps and other low, permanently moist, shaded situations; not uncommon, but nearly restricted to the Coastal Plain. Late summer.

CAMPTOSORUS RHIZOPHYLLUS (L.) LINK. Shaded, mossy rocks in cool situations; a few localities along the Potomac, principally above Cabin John.

ASPLENIUM PINNATIFIDUM NUTT. Crevices and earth pockets of shaded cliffs; Virginia shore of the Potomac several miles below Great Falls; very rare.

ASPLENIUM EBENOIDES R. R. SCOTT. Crevices of shaded rocks; two records, Plummers Island and Virginia shore of the Potomac near Little Falls.

ASPLENIUM PLATYNEURON (L.) OAKES. Grassy or rocky banks and thinly shaded situations generally; abundant.

ASPLENIUM TRICHOMANES L. Crevices of cool, shaded cliffs and on mossy rocks; upper Potomac region chiefly; infrequent.

ASPLENIUM MONTANUM WILLD. Crevices of dryish rocks; a single station, above Great Falls on the Virginia side of river.

graph and with the plant ranging southward through New England and the Appalachian region generally, there can be no reasonable doubt as to the application of Desvaux's name in this sense.

The related lowland plant occupying the periphery of the Piedmont region from Long Island along the Coastal Plain to Florida and the Gulf region (where it alone occurs), and extending some distance up the lower Mississippi Valley, while for the most part recognizable as different from the upland and northern *P. latiusculum*, is highly problematical. It has been described as *Pteris aquilina pseudocaudata* Clute (Fern Bull. 8: 39. 1900), the type being from Babylon, Long Island. Pending field study and the collection of further material it seems best to regard this as a subspecies only: *Pteridium latiusculum pseudocaudatum* (Clute) Maxon.

The plants of western North America also are very difficult of classification, largely, as it seems, because of inherent ability to adapt themselves in different ways to wide extremes of environmental and climatic conditions. They fall into several variable categories, none of which is precisely identical with the European plant, though they are for the most part more nearly related to that than to *P. latiusculum*.

ATHYRIUM PYCNOCARPON (SPRENG.) TIDESTROM. Moist, cool woods and shaded, alluvial banks; a few localities in Rock Creek Park and along the Potomac. (*Asplenium angustifolium* Michx.)

ATHYRIUM THELYPTEROIDES (MICHX.) DESV. Moist, rich woods, mainly in alluvial situations; fairly common, especially along the upper Potomac. (*Asplenium acrostichoides* Swartz.)

ATHYRIUM ASPLENIOIDES (MICHX.) DESV. Low woods, and moist thickets; abundant. (*Athyrium filix-femina* of most American writers, in part.)

DRYOPTERIS HEXAGONOPTERA (MICHX.) C. CHR. Dryish or well-drained deciduous woods; abundant; especially luxuriant in the rich woods of the upper Potomac, on the Virginia side.

DRYOPTERIS NOVEBORACENSIS (L.) A. GRAY. Moist, low woods and thickets; abundant throughout.

DRYOPTERIS SIMULATA DAVENP. Woodland swamps; Hollywood Swamp and near Suitland, Maryland; probably occurs also in other similar situations below the fall line. Late summer.

DRYOPTERIS THELYPTERIS (L.) A. GRAY. Marshes, stream banks, and low thickets; common.

DRYOPTERIS MARGINALIS (L.) A. GRAY. Talus slopes and rocky hillsides in rich woods; common, chiefly along the upper Potomac.

DRYOPTERIS CRISTATA (L.) A. GRAY. Swamps and moist or boggy thickets or thin woods; common.

DRYOPTERIS GOLDIANA (HOOK.) A. GRAY. Rich, deciduous woods; several stations along the upper Potomac, on both sides; rare.

DRYOPTERIS CLINTONIANA (D. C. EATON) DOWELL. Boggy woods; very rare; a single station (Lincolnia, Virginia).

×DRYOPTERIS BOOTHII (TUCKERM.) UNDERW. Moist, wooded ravines; several localities, mostly in "runs" of the upper Potomac.

DRYOPTERIS SPINULOSA (MUELL.) KUNTZE. Rich, low woods; common throughout.

DRYOPTERIS INTERMEDIA (WILLD.) A. GRAY. Moist or dryish woods; fairly common.

(The following hybrids besides *Dryopteris Boottii* have been collected: *DRYOPTERIS CRISTATA* × *MARGINALIS* Davenp.; two collections, near Great Falls, Va., *Dowell*. *DRYOPTERIS GOLDIANA* × *MARGINALIS* *Dowell*; woods near Kensington, Maryland, *Dowell*.)

POLYSTICHUM ACROSTICHOIDES (MICHX.) SCHOTT. Moist woods and cool, shady banks; abundant throughout the range. Easily the most conspicuous fern of the region, especially in winter, the thick evergreen fronds then closely carpeting the many gullies of Rock Creek Park and surrounding country.

ONOCLEA SENSIBILIS L. Moist, open or partially shaded, low situations generally; abundant.

PTERETIS NODULOSA (MICHX.) NIEUWLAND. Shaded, alluvial banks (both sides) and islands of the Potomac above Cabin John; rare. (*Matteuccia Struthiopteris* and *Onoclea Struthiopteris* of many American writers.)

FILIX BULBIFERA (L.) UNDERW. Shaded talus of cliffs, Virginia side of the Potomac in the region opposite Cabin John; very rare.

FILIX FRAGILIS (L.) UNDERW. Shaded, alluvial flats, rocky slopes, and moist woods; abundant in many localities, but chiefly along the Potomac.

WOODSIA OBTUSA (SPRENG.) TORR. Rocky banks and partially shaded cliffs; common, especially along the upper Potomac and the Canal, usually near water but always in well-drained situations.

DENNSTEDTIA PUNCTILOBULA (MICHX.) MOORE. Low woods and moist, thinly shaded banks; fairly common.

EQUISETACEAE

EQUISETUM ARVENSE L. Sandy, often alluvial soil; common; several forms.

EQUISETUM PRAEALTUM RAF. Alluvial banks of the Potomac and tributary streams; occasional patches, but not common.

LYCOPODIACEAE

LYCOPODIUM LUCIDULUM MICHX. Damp woods and springy wooded banks, sometimes in beds of sphagnum; infrequent.

LYCOPODIUM CAROLINIANUM L. Magnolia bogs; only a single locality known, in Prince George County, Maryland.

LYCOPODIUM ADPRESSUM (CHAPM.) LLOYD & UNDERW. Bogs and low, open fields, often in the shallow overflow of springs; abundant at several localities in the Coastal Plain.

LYCOPODIUM OBSCURUM L. Moist woods and thickets; a few scattering localities only.

LYCOPODIUM CLAVATUM L. Moist thickets and pine woods; rare; known only from three widely separated localities.

LYCOPODIUM COMPLANATUM FLABELLIFORME FERNALD. Pine woods and thickets, with *Pyrola*, *Chimaphila*, and *Mitchella*; fairly common.

LYCOPODIUM TRISTACHYUM PURSH. Damp pine woods and thickets; not uncommon.

SELAGINELLACEAE

SELAGINELLA RUPESTRIS (L.) SPRING. Exposed rocky bluffs; found only in the vicinity of Great Falls, on both sides of the Potomac.

SELAGINELLA APODA (L.) FERNALD. Low, moist situations, usually in partial shade; locally abundant, but very generally overlooked. (*Selaginella apus* Spring.)

ISOETACEAE

ISOETES ENGELMANNI VALIDA ENGELM. Temporary pools among rocks; Virginia shore of the Potomac near Great Falls; very rare.

ISOETES SACCHARATA ENGELM. Shallow water between tides, in gravel and sand; banks of the Potomac between Alexandria and Mount Vernon; variable, several forms having been described.

WASHINGTON, D. C.

The Simplest Fern in Existence

R. C. BENEDICT

What is the simplest fern in existence? It is not *Asplenium Trichomanes* with its short wiry midrib and small pinnae. It is not even *Trichomanes Petersii* with not much more than a pinna of leaf tissue and leaves one cell thick. These are perhaps the simplest ferns in the United States from the standpoint of size and structure. The simplest known fern is a native of the tropical East Indies, a species of the genus *Monogramme* Schkuhr, *M. dareaecarpa* Hooker.

In this plant, each leaf has but one vein and one fruit dot or fruiting line, set in a groove along one side of the leaf. The placing of the sporangia was responsible for the original specific name, *dareaecarpa*, after *Darea*, a group of ferns generally placed under *Asplenium*. The plants are epiphytic and grow mixed with mosses on the bark of trees. The stem, like the leaf, has a single solid wood fiber traversing it, only a few cells thick.

The relationship of *Monogramme* is with the fern tribe *Vittarieae*. *Vittaria*, a single species of which, *V. lineata*, occurs in Florida, always has two lines of sporangia while *Monogramme* has but one, but in venation, the largest species of *Monogramme* is almost a duplicate of the smallest *Vittaria*.

The other species of *Monogramme* are almost as simple as *M. dareaecarpa*. The first species discovered, *M. graminea*, from the Bourbon Islands off the coast of Africa, is like *M. dareaecarpa*, but with leaves three or